DOCUMENT RESUME

ED 065 448 SP 005 585

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TITLE Teacher Non-Verbal Activity.
PUB DATE 72
NOTE 20p.; Paper presented at the Annual Meeting of the American Educational Research Assn., Chicago, April 1972

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Communication Skills; *Data Analysis; *Nonverbal Communication; *Teacher Behavior; *Verbal Communication

ABSTRACT

This descriptive research study had as its major objective the development of a category system through which the teacher's physical motions in relation to his verbal actions could be analyzed with a high degree of reliability. The performances of five elementary teachers at the College Demonstration School were recorded on video tape. Narrative typescripts of both verbal and non-verbal "teacher motions" were made for representative, random samplings of lesson segments. Using the analysis system that emerged in this study, two teams of coders analyzed these data. Coefficients of agreement between teams ran consistently high. Hypotheses, concerning non-verbal activity, were projected. (Author)

TEACHER NON-VERBAL ACTIVITY

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AERA 1972 Annual Meeting

Let us focus on the act of teaching as it typically occurs in the classroom. The teacher in the interactive situation

projects a question,
surveys the class to see who is ready to participate,
twiddles his chalk,
points at a student to indicate begin,
nods that the response is correct as he says "yes,"
turns toward the chalkboard,
walks toward board,
raises hand,
writes child's response on the board,
turns toward the class,
walks toward misbehaving child,
places hand on child's shoulder,
turns around,
walks toward desk in the front of the room,
picks up book,
turns to face class,
fingers his newly sprouting goatee. . . .

Even a cursory examination of this brief teaching episode indicates that this teacher is engaged in a steady stream of physical motions and that some of these motions actually serve major pedagogical functions in the classroom.

Yet a survey of related literature reveals that researchers in their studies of teaching have largely neglected this important component of teaching--the manner in which teachers communicate meanings to children using non-verbal language. Although numerous studies on teaching have been conducted, the emphasis in much of the research, as indicated by the following examples, has been on the verbal language of the teacher: (a) Smith and Meux (1962, 1964) identified units of verbal behavior which can be sorted into categories related to such logical operations as classifying, defining, explaining, and evaluating. (b) In like manner, Bellack, Davitz, Kliebard and Hyman (1963) were concerned with teaching as a "language game" involving four basic moves--structuring, soliciting, responding, reacting (cognitive categories). (c) Flanders (1965) also designed a system for describing verbal behaviors of the teacher that exert both direct (accepts student feelings, gives praise, accepts and makes use of student ideas, asks questions) and indirect (lectures, gives directions, gives criticism or justifies authority) influences. (d) Amidon and Hunter (1966) developed a system for looking at the way the teacher motivates, plans, informs, leads discussions, disciplines, counsels, and evaluates. Even though the techniques--direct observation or tape recordings--which these researchers were forced to use limited the scope and dimensionality of their studies, these researchers developed immensely useful systems for recording verbal behavior of teachers in relation to the technology available to them at the time.

A review of some of the literature related to research in teaching also indicates that those non-verbal explorations attempted have been

rather macroscopic and general. The following examples serve to illustrate this point. (a) Hughes (1959) collected both verbal and non-verbal data in the form of specimen records. Two trained observers simultaneously recorded narrative-running accounts of the interactions in which the teacher was included; later coders categorized the recorded data in relation to teaching functions. Few notations of actual non-verbal activity, however, can be found in the sample typescripts. Obviously without the use of video-tape recorders, it was impossible to include a running account of all non-verbal behavior. On the other hand, the study does represent an early attempt to take a closer look at teacher verbal and non-verbal behavior. (b) Galloway (1962), in an exploratory study of observational procedures for determining teacher non-verbal communication, devised seven categories for observing a teacher's non-verbal communication in the classroom setting. Those encouraging communications were "enthusiastic support," "helping," and "receptivity." Those considered as inhibiting communications were "inattentive," "unresponsive," and "disapproval." "Pro forma" was a category considered neutral. (c) More recently (1967) Biddle and Adams collected data in the classrooms of sixteen different teachers using video-taping equipment and described patterns of interaction. At this point in the research sequence technology made it possible for these researchers to examine in more detail fundamental aspects of the teaching act. Nevertheless, studies on non-verbal teacher behavior are few in number and those that do exist tend to be general or exploratory in nature.

Since teaching involves the communication of meanings to children using both verbal and non-verbal language, this researcher (1970) saw as the next step in the research sequence on the teaching act the use of video-tape recordings as a means of studying the non-verbal activity of classroom teachers. The resulting investigation, which was descriptive in nature, had two objectives: (a) the development of a category system through which the teacher's physical motions in relation to his verbal actions could be analyzed with a high degree of reliability and (b) the analysis of two random samples of teacher motions in terms of the category system as a basis for the projection of hypotheses concerning teacher non-verbal performance. The procedures included the following steps: Five language arts lessons, averaging twenty minutes, for each of five teachers of grades one through five at the former William Paterson College Campus School were recorded by means of portable videe-taping equipment. Narrative typescripts of both verbal and non-verbal teacher activity were then made for representative samplings of lesson segments. The segments withdrawn for this purpose were selected in a random fashion so that at least two minutes from each lesson were used and for each teacher at least two, two-minute units from one lesson were part of the samples. The system for analysis, the results, and a discussion of the results are considered in the following sections of this paper.

System for Analysis

What emerged, after numerous variations were attempted, was a composite, multi-faceted design that made possible the analysis of data in a systematic, detailed way, within a unified framework, with considerable accuracy.[1] The analysis system and an actual sample of coded data

are presented in this section.

Analysis System

Two teams of coders analyzed the data using the category system developed in this study. First, verbal and non-verbal components of teacher behavior were coded using numbers in a framework of pedagogical functions based on the Bellack categories projected in THE LANGUAGE OF THE CLASSROOM--structuring, soliciting, reacting, responding.

Second, physical motions were classified into four basic categories and related sub-categories founded on a concept of teacher roles: The first three categories were considered Instructional; the last was considered Personal:

INSTRUCTIONAL

1.0 Conducting. Motions categorized as conducting enable the teacher to control the participation and obtain attending behavior in an interactive setting. They serve as a means of involving the persons (child or children) either verbally or non-verbally. (1.1 Controlling Participation--examples: Nodding at child to indicate begin, Shaking head to indicate his answer is not correct; 1.2 Obtaining Attending Behavior--examples: Placing finger to lips to indicate be quiet, Clapping hands for attention).

2.0 Acting. Motions categorized as acting enable the teacher to hold attending behavior through amplification of meanings. (2.1 Emphasizing--word or group of words--examples: Using hand in downward motion on important words, Tapping desk to emphasize an important point; 2.2 Illustrating--words or concepts--examples: Using hands to show size or shape, Touching fingers to illustrate points one, two, etc.; 2.3 Role Playing or Pantomiming--

object, animal, character--examples: Imitating a tiger, Showing how a tire becomes flat).

3.0 Wielding. The teacher can interact with the physical classroom environment--objects, materials or parts of the room--either directly (using motions made in touching, handling, maneuvering) or indirectly (using motions made in scanning, looking at, reading). He also can make motions that are instrumental to his interacting with the physical environment. (3.1 Wielding Directly--examples: Placing tape-recorder mike in hand, Picking up chalk; 3.2 Wielding Indirectly--examples: Moving head downward to read from a workbook, Moving head upward to look at clock; 3.3 Instrumental to Wielding--examples: Walking over to video-tape recorder to turn off machine, Walking over to bookshelf to get book).

PERSONAL

"P" Self-adjusting. A teacher in the classroom setting is continually modifying his behavior in relation to new and ever changing conditions. Self-adjusting maneuvers include alteration of stance or posture to achieve comfort, alteration of articles on person for practical or social reasons, mannerisms, motions used to release tension--motions necessary because one is human. These motions tend to relate to the teacher's own person; they occur as the teacher modifies his actions when confronting varying stimuli that keep him in a perpetual state of readiness. (P--examples: Scratching head, Playing with beads, Adjusting glasses, Crossing legs) Self-adjusting motions were recorded as "P"; they were not included in the framework of move patterns.

Third, physical motions were classified as either serving in the place of or facilitating a Bellack pedagogical function--for example:

S/1 Structuring--Pointing to reading assignment on board to indicate that reading will be next; F/1 Structuring--Looking around the class, "I think that we are ready to go outside."; S/2 Soliciting--Surveying class group; F/2 Soliciting--Leaning forward toward child, "Do you have a dog at home?"; S/3 Responding--Nodding head in answer to the question; F/3 Responding--Pointing to doorway, "Yes, you may go to the office."; S/4 Reacting--Shaking head to indicate, "no"; F/4 Reacting--Emphasizing words with hand, "Excellent, John!".

Finally, five move patterns consisting of different verbal and non-verbal components or combinations were identified. (Pattern A--example: "Very good, John," Nodding his head, Writing John's answer on board--verbal component plus a non-verbal facilitating motion(s); Pattern B--example: "Excellent, Mary!"--verbal serving pedagogical function; Pattern C--example: The teacher may lower her head toward the book, scan the page for the next question, but because of some other happening in the room or a change of mind, she does not ask the question--empty component or set with motions that facilitate; Pattern D--example: Nodding head to indicate John's answer is correct plus Turning head toward board, Raising hand to board to write, and Writing John's response on the board--non-verbal motion serving plus non-verbal motion(s) facilitating; Pattern E--example: Nodding in reaction--non-verbal motion serving pedagogical function.)

Each codable unit of motion in the teaching segments, identified by viewing video-tape recordings and reviewing typescripts, was analyzed by coders in terms of this category system.

Actual Coding of An Episode

The following is an excerpt from the actual data that has been coded using the system developed in the study. An example is also given of the coded data as it is transposed from the running context to the recording form.

Coded Data in Running Context.

	1.1 S/1	1	Pointing toward the words "noisy" and "quiet" on the board to indicate the focus of the discussion to follow	
1	1.1 F/1		Turning head toward board as she points	
2	1.1 F/2		Turning back to face class group	2a. "Who has either a quiet or noisy thing? And you'll have to tell me which it is." S/2
2	2.1 F/2		Moving hand outward as she says "quiet"	
2	2.1 F/2		Moving other hand outward as she says "noisy"	
	1.1 S/2	3	Surveying group	
3	P		Adjusting glasses	
4	1.1 F/2		Pointing to child who has his hand raised	4 "Calvin?" S/2
			Child says: "A rooster is a noisy thing."	
	1.1 S/4	5	Nodding head to indicate answer is correct	
5	1.1 F/4		Turning body toward easel	
5	1.1 F/4		Raising hand to write	
5	1.1 F/4		Writing response on easel	
6	1.1 F/2		Turning to face class group	6 "Can you think of another noisy animal?" S/2
	1.1 S/2	7	Surveying group	
	1.1 S/2	8	Pointing to child who raises hand	
			Child says: "Does it have to be an animal?"	
9	1.1 F/3		Shaking head	9 "No, not necessarily." S/3

Data Transposed to Recording Form. An example of the coded data as it is transposed from running context to the recording form is given below:

		INSTRUCTIONAL				PERSONAL
Move #	Type Move	Verbal Component Serving	Non-verbal Component(s) Facilitating Serving		Pattern	
1.	1 Stru.		1.1	1.1	D	
2.	2 Sol.	x		1.1 2.1 2.1	A	
3.	2 Sol.		1.1		E	P
4.	2 Sol.	x		1.1	A	
5.	4 Reac.		1.1	1.1 1.1 1.1	D	
6.	2 Sol.	x		1.1	A	
7.	2 Sol.		1.1		E	
8.	2 Sol.		1.1		E	
9.	3 Resp.	x		1.1	A	

Reliability of the System

Although preliminary studies conducted during the development of the system for analysis indicated high agreement between coders, it was necessary to check reliability of the final system under controlled conditions. The results as presented in Table I indicate a consistently high degree of reliability for all categories of analysis: the coefficient of agreement ranged from .80 to 1.00.

TABLE I[2]

COEFFICIENT OF AGREEMENT BETWEEN TWO TEAMS CODING PHYSICAL MOTION*

Category	Coefficient of Agreement (R_i)
Instructional	
Conducting	.970
Controlling Participation	.962
Obtaining Attending Behavior	.896
Acting	.940
Emphasizing	.921
Illustrating	.916
Role Playing or Pantomiming	1.00
Wielding	.952
Direct	.884
Indirect	.862
Instrumental	.800
Personal	.995

*Each of the two teams comprised two individuals.

Results

This section presents a summary of the findings that emerged in the trial run of the multi-dimensional system and the statistical analysis of the resultant data. (A more detailed treatment of the results and related tables can be found in a chapter contained in a volume, STUDIES IN THE LANGUAGE OF THE CLASSROOM, edited by Arno A. Bellack and published by Teachers College Press.)*

1. The five teachers in this population sample varied in the amount of activity in which they engaged.
2. These teachers maintained approximately the same rank order in the number of physical motions used in each of the two-minute samples within the same lesson; teachers shifted positions, however, in their use of verbal moves.
3. Teachers were quite similar in the high percentage of non-verbal, physical motions they used as compared to verbal moves.
4. When similar dimensions were compared, teachers used a greater percentage of the verbal in carrying on the major pedagogical functions in the classroom.
5. Teachers varied in the number of Instructional and Personal motions used.
6. Generally, teachers tended to use a similar proportion of Instructional motions as compared to Personal motions.
7. Of the three Instructional categories identified, teachers in this particular population used motions in the following descending order of frequency: Conducting, Wielding, Acting.
8. Teachers did not tend to use Role Playing and Pantomiming, included under the major rubric Acting. Similarly, a small percentage of

*See Appendix for sample tables.

motions teachers made were used in amplifying the communication of meanings through Emphasizing.

9. Teachers devoted the largest proportion of their Instructional type motions Facilitating a Bellack move, rather than Serving the pedagogical function.

10. Generally, teachers did not tend to use Acting or Wielding motions to serve a Bellack pedagogical function in the classroom.

11. When verbal and non-verbal components were combined, a marked similarity in the percentage of actions used by each teacher in relation to move types--structuring, soliciting, responding, reacting--was noted. There was less consistency among teachers when the verbal and non-verbal components were considered separately.

12. Teachers differed more in their non-verbal use of Soliciting moves than in their verbal use.

13. The greatest proportion of move types used by these teachers was to perform Soliciting and Reacting pedagogical functions in the classroom. A very much smaller percentage of teacher moves was used to perform Structuring and Responding pedagogical functions. (These results support the findings in the Bellack study projected in THE LANGUAGE OF THE CLASSROOM.)

14. Four of the teachers in this population sample used approximately the same number of non-verbal moves that serve a Bellack pedagogical function. The larger number of motions used by one of the teachers may well be attributed to his use of audio-visual materials. Teachers varied, however, in the number of verbal moves they made.

15. Teachers were remarkably similar in the percentage of Move Pattern A--verbal serves plus motions that facilitate(s)--that they used.
16. Findings indicated that a teacher can vary within himself in his use of motions from one two-minute time unit to another within a lesson and from lesson to lesson.
17. A teacher, on the other hand, can operate within a rather narrow range of activity over time and within a lesson.
18. A teacher can be the only one in a particular population that uses a certain kind of motion.

Discussion

Contained in this section are numerous hypotheses which were drawn from the results, sample performance profiles, and a general summary.

Hypotheses[3]

Based on the results hypotheses were projected that relate to verbal and non-verbal behavior, Instructional motions and Personal motions.

Verbal and Non-verbal Behavior.

1. Aspects of a teacher's activity (non-verbal, physical motions and/or verbal moves) might contribute to his own unique performance in the classroom.
2. That physical motions occur more frequently than verbal moves in teaching can be hypothesized.
3. Teachers, on the other hand, tend to use more verbal moves than non-verbal moves to serve pedagogical functions in the classroom.
4. Related verbal and non-verbal behaviors of teachers do not always occur simultaneously in time; occasionally, however, unrelated

behaviors can occur simultaneously in time.

Instructional Motions.

1. Teachers vary more in the size of the variance range for Instructional motions than for Personal motions.
2. Teachers vary from one to the other in the actual number of Instructional motions they use.
3. A single teacher uses a variety of Instructional motions to serve or facilitate a particular pedagogical function in the classroom.
4. A teacher uses the same kinds of physical motions (perhaps with a slightly different twist) to perform or facilitate differing functions--structuring, soliciting, responding, reacting. Pointing in one instance can mean: begin (solicitation); in another situation it can indicate: very good (reaction); and in still another instance it can mean that the answer is correct.
5. Although teachers may vary from one another in the actual number of motions they use to perform each function, they tend to draw upon the same kinds of motions to communicate: They all survey, point, nod, etc. in cyclical patterns that are repeated continuously in the interactive situation. It may be hypothesized, therefore, that such motions are a part of the "recipe" knowledge of the school, the institutionally appropriate rules of conduct.

Personal Motions.

1. Teachers differ from one another in the use of Self-adjusting motions, both in number and kind.
2. As the number of instructional cyclical patterns increases, the number of personal motions also increases.

Performance Profiles

Based on the notion that the phenomenon of a teacher's performance stems not from a single definable factor, but rather from the interaction of several relevant factors, this researcher developed an inferred profile of distinctive characteristics for each teacher. Two examples are given below:

Teacher 2. The larger percentage of Conducting motions this teacher used might play a role in her teaching performance. In addition, she was the only teacher who used Acting motions to serve a pedagogical function. That she had the smallest variance range of all the teachers in her use of Self-adjusting motions in Random Sample I was also indicated. Moreover within a lesson, she operated in a narrow range in her use of Self-adjusting motions, as she used about the same number in each two-minute section studied.

Teacher 5. This teacher might be characterized as the most active of all the teachers--both non-verbally and verbally. He used the largest number of total physical motions in both Random Sample I and II. For both total physical motions and verbal moves his variance ranges were the largest of all the teachers in Random Sample I. In addition, he used the largest number of Instructional motions as well as Self-adjusting motions of all the teachers in both Random Samples I and II. That this teacher was active verbally was also evident. He used the largest number of verbal moves in Sample I and second largest number in Sample II; his variance range for this dimension was also the largest in Random Sample I. Generally, his variance range in both the verbal and non-verbal areas tended to be large.

The factors in each teacher's profile that can be considered distinctive characteristics of his or her performance are summarized in Figure 1 found in the Appendix.

General Summary

The present study began with the question: Is it possible to develop a category system through which an elementary school teacher's non-verbal classroom activity can be reliably analyzed? Such a category system was developed, and it produced reliability coefficients in the area of .80 to 1.00. Second, this researcher attempted a trial run of the system as a basis for hypothesizing about non-verbal teacher performance. Numerous hypotheses were projected.

In 1971 based on a detailed analysis of the original typescripts and statistical data resulting from this study, Grant and Hennings extended the study to identify ten non-verbal dimensions of teaching style: (a) "Activity," (b) "Verbal/Non-verbal Orientation," (c) "Conducting-Acting-Wielding Ratios," (d) "Instructional-Personal Ratio," (e) "Structuring-Soliciting-Responding-Reacting Ratio," (f) "Teaching Pattern Tendencies," (g) "Internal Variance," (h) "Instructional Repertoire," (i) "Personal Repertoire," and (j) "Verbal Repertoire."[4] Using these dimensions, they analyzed the classroom behavior of five teachers in a case-study approach and hypothesized ways in which teachers can study their own non-verbal activity to increase its effectiveness.

Footnotes

[1]The analysis system is considered in more detail in a chapter contained in STUDIES IN THE LANGUAGE OF THE CLASSROOM edited by Arno A. Bellack and in THE TEACHER MOVES: AN ANALYSIS OF NON-VERBAL ACTIVITY co-authored by Barbara M. Grant and Dorothy Grant Hennings. Both volumes are published by Teachers College Press.

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[3]Reprinted with permission of Teachers College Press. Hypotheses are presented in greater detail in the following volume: Barbara M. Grant, "A Method for Analyzing the Non-verbal Behavior (Physical Motions) of Teachers of Elementary School Language Arts" (a Doctoral dissertation, Teachers College, Columbia University, 1970), copyright, 1970 by Barbara M. Grant.

[4]Barbara M. Grant and Dorothy Grant Hennings, The Teacher Moves: An Analysis of Non-verbal Activity. New York: Teachers College Press, 1971.

Citations

Barbara M. Grant and Dorothy Grant Hennings, The Teacher Moves: An Analysis of Non-verbal Activity (New York: Teachers College Press, 1971). By permission of Teachers College, Columbia University.

Arno A. Bellack, editor, Studies in the Language of the Classroom (New York: Teachers College Press, forthcoming). By permission of Teachers College, Columbia University.

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Appendix*

TABLE II

HOW TEACHERS MOVE

1.0 Conducting		62.5%
1.1 Controlling Participation	57.04%	
1.2 Obtaining Attending Behavior	5.47%	
2.0 Acting		8.8%
2.1 Emphasizing	4.25%	
2.2 Illustrating	4.45%	
2.3 Role Playing or Pantomiming	.05%	
3.0 Wielding		28.7%
3.1 Direct Wielding	11.63%	
3.2 Indirect Wielding	7.87%	
3.3 Instrumental Wielding	9.24%	

TABLE III

INSTRUCTIONAL PHYSICAL MOTIONS USED BY TEACHERS

Teacher	Total	Conducting	Acting	Wielding
Teacher 1	378	230 60.8%	31 8.2%	117 31.0%
Teacher 2	322	262 81.4%	29 9.0%	31 9.6%
Teacher 3	394	240 60.9%	15 3.8%	139 35.3%
Teacher 4	467	258 55.2%	82 17.6%	127 27.2%
Teacher 5	485	289 59.6%	22 4.5%	174 35.9%

TABLE IV

INSTRUCTIONAL AND PERSONAL MOTIONS
USED BY TEACHERS

Teacher	Total Number	Instructional	Personal
Teacher 1	521	378 72.6%	143 27.4%
Teacher 2	403	322 79.9%	81 20.1%
Teacher 3	436	394 90.4%	42 9.6%
Teacher 4	594	467 78.6%	127 21.4%
Teacher 5	671	485 72.3%	186 27.7%
Average	525	409.2 77.9%	115.8 22.1%

Five two-minute segments of teaching were used for each teacher.

*The tables in the Appendix are reprinted with permission of Teachers College Press.